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CONTROL OF PHOMA ROT OF TOMATOES

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Phoma rot or black spot is an important disease of tomatoes caused by the fungus *Phoma destructiva* Plowr. It is most conspicuous on ripe fruits after they have reached the markets, although it attacks the stems and foliage of the plants at any time from the seedling stage to maturity. The disease was first reported as causing great loss to growers in Dade County in 1912, and since that time it has caused more or less damage to fall and winter crops in most tomato growing sections of the State. The seriousness of the disease varies from year to year with weather conditions, it being more severe during cool damp weather. Reports of the United States Department of Agriculture show that it also occurs in spring crops of tomatoes shipped from Florida but to less extent than in winter crops.

During the past three years experiments for the control of this disease have been conducted at the Sub-Tropical Experiment Station at Homestead and the recommendations given herein are based upon results of these tests.

The importance of phoma rot as a disease of tomato plants in the field is usually overlooked or underestimated, because it cannot be readily distinguished from other diseases, especially early blight. It attacks the leaves and stems and may cause a great reduction in yield by killing the vines prematurely. It usually does not appear on the green fruits in the field, except on the ones that have growth cracks or have received some mechanical injury. However, spores of the fungus are deposited on the fruits from the diseased plants in the field and during the washing and packing processes they get into the wounds caused by sand, nails or other injuries accompanying rough handling. Decay then begins to develop in transit and by the time the fruits reach the Northern markets, many of them are unmarketable.

On the mature fruits the decay first appears as small, sunken, water-soaked spots which enlarge fairly rapidly in storage and in transit. As the spots enlarge, their centers turn dark to black and develop small pimples (spore cases of the fungus). These pimples serve to distinguish phoma rot from other kinds of decay.

CONTROL

To control black spot successfully, the fight must begin in the seedbed. The seedbeds should be located on new land as far as possible from fields that grew tomatoes the year before, since old vines and volunteer plants carry over the fungus from one season to the next. A series of seedbeds for a season should not be sown adjacent to each other. If the older plants of the first bed become infected, they will serve as a source of infection for

the younger plants in new beds. After the first leaves have developed, the seedlings should be sprayed with 2-2-50 bordeaux and thereafter with 4-4-50 at intervals determined by weather conditions. During periods of rainy or foggy weather, the plants should be sprayed every week, but when the weather is dry an application every two weeks should be sufficient. To be effective, the plants must be sprayed *thoroughly*.

When the disease is controlled in the field, there may still be sufficient spores adhering to the fruit to cause appreciable decay in transit and in storage, unless the fruits are handled carefully and treated with a fungicide immediately after they are picked. Of the materials tested so far, borax and a special highly concentrated commercial mixture containing sulphur in the forms of sodium polysulphides and sodium thiosulphates (sulfocide) have proved most effective for this purpose. Both of these materials are relatively cheap and do not leave a conspicuous residue on the fruit or injure its keeping qualities. Borax is used in a 5 percent solution (approximately 6 ounces borax to one gallon water) and the previously mentioned sulphur solution is diluted at the rate of one gallon of the concentrate to 150 gallons of water. The borax solution is more effective when the temperature is kept at 100° F.

Furthermore, the tomato fruit is very difficult to wet and it is necessary to add a wetting agent to either of the solutions. Tar soap (liquid or flakes) added at the rate of two pounds to 50 gallons of the solution has proved very satisfactory for this purpose.

The treatment is most effective when applied in the field immediately after the fruit is picked. A momentary immersion of the fruits is all that is necessary. Consequently, the solution may be placed in the field in vats or barrels and the fruit dipped in or poured into the solution before placing in field crates for hauling to the packinghouse. The chief advantage of applying the treatment in the field is that it removes the sand, thereby reducing the amount of mechanical injury caused by it. It also removes the spores or prevents them from germinating in the injuries that may occur from various causes. However, this should not encourage careless handling, as the solution may not reach the spores in deep cuts and bruises. After the fruit has been dipped, it should not be stored in contact with burlap or in crates that have been used for non-treated fruit or that have been used in diseased fields. These solutions are used instead of water for washing the fruit and the fruit should not be washed in water after treatment.

The treatment will prevent practically all of the phoma rot in tomatoes from fields in which the disease has been reduced to a minimum by spraying. It will also prevent a large percentage of decay in fruits from non-sprayed fields, but is less effective than the combination of spraying in the field and treatment after picking. Extreme care should be taken in handling the fruit during cool, wet weather, as these conditions are much more favorable for development of the disease than warm, dry weather.

Along with the experiments on the control of phoma rot by application of bordeaux spray supplemented by the fungicidal washes, tests have been conducted to ascertain the resistance of fruits of various tomato varieties to this disease and others. In these tests it was found that Pritchard's Scarlet Topper, Marglobe and Globe showed the greatest natural resistance to disease. The fruits of all these varieties from sprayed plots showed a low percentage of disease after they were ripened in storage. Further tests are being made with several varieties.